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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/695,414      | 10/25/2000  | Hongyong Zhang       | 0765-2218           | 2545             |

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NIXON PEABODY LLP  
8180 GREENSBORO DRIVE  
SUITE 800  
McLEAN, VA 22102

EXAMINER

PERT, EVAN T

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2813

DATE MAILED: 12/04/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/695,414

Applicant(s)

ZHANG ET AL.

Examiner

Evan T. Pert

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The examiner notes that pages 4 and 5 of the specification are missing from the file wrapper, a fact seemingly overlooked until now. For purposes of examination, the missing text is presumed to correspond to the text of U.S. Patent 6,156,627 at col. 2, line 46 to col. 3, line 48.
2. The specification is objected to under 37 CFR 1.71(c) for not clearly setting forth how "not exposing to air outside the chamber" is an improvement over Liu et al., rather than a "design choice". Applicant's own specification indicates that annealing for crystallization can be performed in the same chamber where the crystallization promoting material is applied or "may be taken out of the chamber" to enable putting it in another chamber for annealing [page 6, lines 13-16].

In applicant's embodiment 5, at page 15, lines 28-29, applicant reports superior results when the substrate is "taken out from the chamber" and *then* a "solid phase growth" is performed. Clearly, when the substrate is removed from the chamber in applicant's embodiment 5, the substrate is inherently "exposed to air outside the chamber" and, even so, applicant admits to achieving better results as compared to the embodiments where the substrate is not exposed to air outside the chamber [page 15, lines 29-32].

In light of a lack of a clear description of the improvement attained by "not exposing to air outside the chamber", applicant is required to amend the specification or explain and clarify how "not exposing to air" is an improvement over Liu et al..

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Turner et al..

Liu et al. teach a method of selectively crystallizing (and thus patterning) an amorphous silicon film deposited on an insulating substrate by using a thin film thermal (vapor) deposition of palladium or nickel [col. 5, lines 66-68], particularly useful in forming a TFT [col. 1, line 24].

Liu et al. do not teach that the substrate under processing should not be exposed to air from the time the metal is deposited to the time the amorphous film is crystallized. However, it would have been obvious to utilize the same tool or a cluster tool to process the substrate from the time the metal film is formed through crystallization, to save floor space, for example.

One of ordinary skill in the art would have been motivated to avoid exposing a substrate to air after nickel is formed, for example, to prevent the nickel from oxidizing. Alternatively, one of ordinary skill in the art would want to avoid exposure to air because "air" outside the chamber is dirty and could contaminate a device under construction.

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Alternatively, and in response to applicant's argument that "not exposing to air outside the chamber" is not disclosed in the prior art, one of ordinary skill in the art would be motivated to use a "high through-put" apparatus for processing semiconductor films on glass substrates, such as that disclosed by Turner et al..

In order to provide an "oxygen" or an "argon" atmosphere for crystallization per Liu et al., one of ordinary skill in the art would want to follow the well-known process reviewed by Turner et al. where a chamber is "pumped down" or "evacuated" prior to introducing pure process gas from a gas bottle [col. 1].

Turner et al. explain the undesirable time limitations in "pumping down" a chamber for each process step required by Liu et al.. Liu et al. require a "thermal evaporation" of palladium, for example, followed by a rapid thermal anneal in "oxygen" (but not "outside air") or "argon" [Example 2].

Turner et al.'s apparatus would allow higher throughput in practicing the invention of Liu et al. than two separate chambers that need to be pumped down before each process step. One of ordinary skill in the art, at the suggestion of Turner et al. would be motivated to combine multiple process steps in a single vacuum chamber, combining process steps for reduced floor space and higher through-put.

There is nothing "unexpected" about "not exposing to outside air" set forth by applicant and one of ordinary skill in the art would be motivated to use a "high through-put" system that inherently anticipates "not exposing to air outside the chamber" between each processing step.

***Response to Arguments***

4. Applicant's amendment overcomes rejections of record under 35 USC 112.
5. Applicant's arguments filed 8-31-01, regarding the "not exposing to outside air" limitation, have been fully considered but they are not persuasive.

Applicant argues, "nothing in Liu raises the problem of exposure of the semiconductor device to outside air that could contaminate the device" [page 5, paper no. 6] and that "the examiner could only have based the 103 rejection on hindsight" [page 6, paper no. 6].

Yet, applicant does not ever explain in the specification any problem with outside air and even teaches a "superior" embodiment 5 that was inherently exposed to air when it was taken out of the promoting material chamber to be put in an annealing chamber [see item 2 above]. How did the examiner use hindsight when applicant does not provide any reasoning or direction for "not exposing to air"? Only the examiner has provided any reasoning for "not exposing to outside air".

In actuality, applicant sets forth the option of "not exposing to air" as a mere matter of "design choice" [see all of col. 3, particularly lines 61-65 of U.S. Patent 6,156,627, corresponding to missing text of pages 4 and 5 of the specification of this case].

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zhang et al. (U.S. Patent 6,156,627) is cited as providing missing text for examination [see item 1 above].

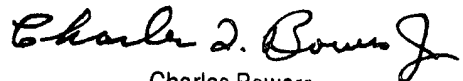
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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan T. Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers can be reached on 703-308-2417. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ETP  
November 15, 2001

  
Charles Bowers  
Supervisory Patent Examiner  
Technology Center 2800